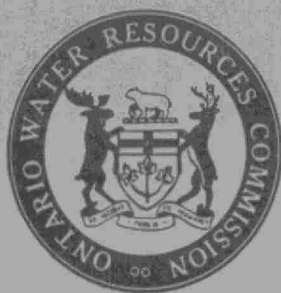


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THE

ONTARIO WATER RESOURCES

COMMISSION

WATER POLLUTION SURVEY

of the

VILLAGE OF MARMORA

COUNTY OF HASTINGS

1965

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VILLAGE OF MARMORA
- 1965
COUNTY OF HASTINGS

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Report on a water pollution
survey of the village of Marmoa
in the county of Hastings.

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THE
ONTARIO WATER RESOURCES
COMMISSION

Report on
a
WATER POLLUTION SURVEY
of the
VILLAGE OF MARMORA
in the
COUNTY OF HASTINGS

Division of Sanitary Engineering

1965

Report on a
WATER POLLUTION SURVEY
of the
VILLAGE OF MARMORA

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Report on a
WATER POLLUTION SURVEY
of the
VILLAGE OF MARMORA

INTRODUCTION

A water pollution survey of the Village of Marmora was performed during the autumn months of 1965, with investigations being performed on October 14 and 26. This study was focussed on conditions which are existing and potential sources of surface water pollution. Recommendations are made concerning the abatement of conditions which adversely affect water quality. Appended to this report is a map of Marmora showing the locations of sampling points.

PREVIOUS SURVEYS BY OWRC STAFF

The initial water pollution survey of Marmora was performed by OWRC staff during the month of July 1961. The pertinent survey report included the following recommendation;

"From the standpoint of environmental sanitation and protection of the sanitary chemical and bacteriological quality of the waters of the Crowe River at Marmora, it would be desirable for the village to proceed with its plans for constructing municipal sewage works. Even a partial sewage works development, as proposed, would alleviate the sewage disposal problems which exist in the commercial section of Marmora. Such a system could serve the Marmora Dairy where the industrial wastes presently discharge to a marshy area near the Crowe River."

INTERVIEWS WITH OFFICIALS

Discussions were held with the following officials during the recent survey in October, 1965:

Mr. W. A. Shannon, Reeve;
Dr. H. G. Parkin, Medical Officer of Health;
Miss M. Savage, Clerk-Treasurer;
Mr. W. Bishop, Works Superintendent.

VILLAGE OF MARMORA

Marmora is located at the junction of Highways 7 and 14. The 1965 Municipal Directory indicates that the population of the village is approximately 1,331. The area of the municipality is approximately 370 acres.

The Crowe River flows in a southerly direction through the western part of the village and empties into the Trent River approximately nine miles downstream from Marmora.

WATER USES

Municipal

The Crowe River is the source of water supply for Marmora's municipal water works.

Industrial

Industrial use of water in Marmora is negligible due to the relative absence of industrial activity within the confines of the village.

Recreational

The popular bathing area is located on the east side of the river, just south of Highway 7.

WATER SUPPLY

Marmora's municipal water works was constructed as an OWRC project and was placed in service early in 1962. The water purification plant is located on the east bank of the Crowe River in the northern part of the village. The river water flows by gravity through a 10-inch diameter intake pipe which extends for approximately 270 feet from the upstream side of a dam to the plant. Filtration is effected by vacuum diatomite filters. Activated carbon is used when required to control the taste and/or colour of the water. Chlorine is applied at the suction side of the pumps. Elevated water storage is provided by a standpipe having a capacity of 435,000 gallons.

Approximately 80 per cent of the village's area and population is served by the municipal water distribution system. Since the commercial section and most of the residential area are located east of the Crowe River, this part of the village is served more intensively than the region lying west of the river. However, a water main extends westward across the river to serve a complex of houses which is located north of Highway 7.

SEWAGE DISPOSAL FACILITIES

In the absence of municipal sanitary sewers and sewage treatment works, the majority of the premises are served by septic

tank systems. It was reported that some sewage flows gain access to the storm sewers which extend in a westerly direction along Matthew Street (Highway 7) and discharge through one outlet to the Crowe River.

Problems associated with sewage disposal in Marmora are most prevalent in the commercial area which is located on both sides of McGill Street between Madoc Street and Matthew Street (Highway 7). The limited areas of many of these premises deter the installation of adequate sub-surface sewage disposal systems, especially where high volumes of sewage flow occur. Attempts have been made to provide sub-surface sewage disposal systems at the rear of premises located on the west side of McGill Street. Varying degrees of success have been achieved in the operation of these systems. Fill has been utilized in some instances to deter the escape of sewage flows to the low-lying area located near the Crowe River. Waste from a commercial laundry discharges to the swampy area near the river and results in excessive ponding of this sewage in an area where it could gain access to the watercourse.

When a community or municipality acquires a public water supply, it usually is noted that residents tend to use more water. Consequently, a greater volume of sewage requires disposal. If private sewage disposal facilities of limited capacity are employed, it is obvious that problems related to disposal frequently occur.

PROPOSED SEWAGE WORKS

At the time of the initial OWRC water pollution survey at Marmora during 1961, the village officials were attempting to embark on a programme to provide sanitary sewers and a waste stabilization pond which would serve the central or congested part of the municipality. Circumstances prevented the commencement of such a project at that time.

The municipal officials at Marmora are still eager to acquire sewage works which are needed in the village. These officials have conferred with the OWRC during 1965 concerning the extension of water mains and the construction of sewage works. The village officials have received an updated preliminary report on sewage works from their firm of consulting engineers. Specific comments regarding the report are not included in this presentation because the municipal council had not had an opportunity to review the report at the time of this survey. It is noted that the revised proposals do not differ greatly from the original plans. The central part of the village would be served by sanitary sewers from which storm water would be excluded. The effluent from the sewage treatment unit would be discharged to the Crowe River in the downstream part of the village.

SURFACE WATER DRAINAGE

Surface run-off flows drain to the Crowe River. Only one storm sewer outlet was observed during this survey, and it is located on the east bank of the Crowe River approximately 300 to 400 feet

south of the Highway 7 bridge. This storm sewer system serves Matthew Street (Highway 7) and receives flows from lateral storm sewers located on such streets as Hays Street and Hastings Avenue. The absence of storm sewers on McGill Street in the commercial part of the village reportedly presents a problem and, in at least some instances, results in roof drainage being discharged to private sewage disposal systems.

INDUSTRIAL OUTFALLS

Marmora Dairy and Neal's Dairy are two premises in Marmora which produce waste flows of an industrial nature. The locations are shown on the appended map.

Marmora Dairy

Pasteurizing and bottling of milk for the retail trade is the basic function of this plant. Although the industrial waste from this dairy was flowing to a marshy area near Cameron Street on October 14, 1965, the waste was not gaining access to the river. However, the location of this marsh is such that the waste might gain access to the watercourse during periods of severe surface run-off. Although the manager of this dairy had advised OWRC staff during previous routine inspections that an adequate method of industrial waste disposal would be devised, it was evident during this survey that unsatisfactory methods of disposal are still employed. The proposed municipal sewage works could receive the sewage flows from this plant.

Neal's Dairy

This plant is located on the east side of McGill Street in Marmora's commercial area. Reportedly, the industrial waste flows are discharged to a sub-surface sewage disposal system which is located on the dairy premises.

COMMERCIAL OUTFALLS

The only commercial firm in Marmora which experiences a severe waste disposal problem is the automatic laundry which is owned and operated by Mr. A. J. McCaw, and is located on the east side of McGill Street near the Royal Hotel. Liquid waste from this laundry operation is discharged to a sewer which appears to function as a private facility and conducts the flows to the low-lying area located near the Crowe River.

MUNICIPAL REFUSE DISPOSAL SITE

The refuse disposal site which is utilized by the residents of Marmora is located a short distance east of the village in the Township of Marmora. The refuse is burned and the residue is covered with earth material. It is unlikely that this operation presents a hazard to water quality.

SAMPLING PROCEDURE

Samples were collected from the Crowe River at three locations in Marmora on October 14, 1965. Samples were obtained from the Marmora Dairy discharge, and from the municipal storm sewer effluent. The laundry waste discharging to the low-lying area near

the river was sampled on October 26, 1965.

The locations of sampling points are shown on the appended map of the village. The pertinent laboratory results are similarly attached in Tables I and II.

INTERPRETATION AND SIGNIFICANCE OF LABORATORY RESULTS

The analyses employed to determine the quality of samples include: biochemical oxygen demand (BOD), solids, nitrogen, and detergents. Bacteriological examinations were performed to enumerate coliform organisms.

The BOD of sewage or polluted waters is the oxygen required during stabilization of the decomposable organic or chemical material by aerobic biochemical action. A five-day BOD determination with incubation at 20 degrees Centigrade is reported. The BOD of a watercourse should not exceed four parts per million (ppm).

The analyses for solids include tests for total, suspended and dissolved solids. The results are reported in parts per million. The first test measures both the solids in solution and in suspension. The suspended solids indicate the measure of undissolved solids of organic or inorganic nature in suspension. Significant sources of suspended solids are sewage, industrial wastes, and land erosion. Suspended solids in water can present difficulties in water purification, and might result in deposits in streams which can interfere with the habitat of aquatic life. The dissolved solids are a measure of those solids in solution.

Nitrogen determinations were performed in some instances to ascertain the nitrogen content of the Crowe River. Ammonia nitrogen, which sometimes is called free ammonia, is the soluble material produced in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia might be taken from the atmosphere in rainwater. The following values might be used in appraising free ammonia content.

Low	-	0.015 to 0.03 ppm
Moderate	-	0.03 to 0.10 ppm
High		0.10 or greater

Total Kjeldahl nitrogen is a measure of the total nitrogenous material present except that which is measured as nitrite and nitrate nitrogens. The total Kjeldahl nitrogen less the ammonia nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen values are important in determining the availability of nitrogen for biological utilization. The normal range for total Kjeldahl nitrogen is 0.1 to 0.5 ppm. Since nitrite nitrogen and nitrate nitrogen occur in the latter part of the nitrogen cycle, these parameters of pollution were not utilized during this survey where any significant pollution of the river at Marmora probably would be of recent occurrence.

The presence of anionic detergents as ABS usually is an indication that domestic waste is present.

The coliform count is employed to obtain an enumeration of coliform organisms. The presence of coliforms indicates pollution

by human or animal excrement, or by some non-faecal forms. The number of coliforms, is reported per 100 millilitres (ml.) of the sample. The membrane filter technique was used in the examination of these water samples. It is the opinion of the OWRC that the presence of coliforms in a watercourse should not exceed 2,400 organisms per 100 ml. of water.

SAMPLE RESULTS

Table I - Crowe River in Marmora

According to the appended laboratory results, the quality of the Crowe River water did not deteriorate significantly in Marmora on October 14, 1965, as evaluated by BOD, solids, and coliform content. Although the free ammonia content of the water was slightly high at the upstream sample point (TX 47.50), the content was moderate at the sample points located downstream at the bathing area and opposite Linn Street. There are no known outfalls to the river in Marmora upstream from the dam. The content of total Kjeldahl nitrogen increased as the river flowed through the village, although the values indicated were not excessive.

The Medical Officer of Health reported on October 26 that water samples have been collected from the Crowe River at the bathing areas during the summer months and that the coliform content of these samples has been somewhat high but still within acceptable limits for bathing requirements.

Table II - Outfalls to Crowe River in Marmora

Although the industrial waste flows discharging from Marmora Dairy to a site located south-west of the plant were not gaining access to the Crowe River during this survey, this method of disposal is not an acceptable procedure. The laboratory results reveal the high BOD, solids, and coliform content of this waste.

The objectionable quality of the waste which reportedly originates at the commercial laundry on McGill Street and discharges to an area where it can gain access to the Crowe River is revealed by the laboratory results. The waste discharging from this outfall (Sample Point No. TX 47.28P) was ponding near the river.

SUMMARY

A water pollution survey of the Village of Marmora was performed by OWRC staff on October 14 and 26, 1965. These investigations were made to review conditions revealed during a previous survey in 1961.

Although Marmora has acquired a municipal water works system, municipal sewage works have not been provided. Consequently, sewage flows are discharged either to private disposal systems or to such destinations as the Crowe River and low-lying areas located near the watercourse. Objectionable environmental conditions arise occasionally and cause direct concern to the Medical Officer of Health. Obviously, a public sanitary sewer system and associated treatment facilities are required to serve at least the central part of the village.

The water pollution survey performed at Marmora by OWRC staff during 1961 indicated the desirability of acquiring municipal sewage works. Although such a project was considered but was not initiated at that time, the municipal officials are eager to proceed with the construction of these works at the present time.

RECOMMENDATION

The provision of municipal sewage works at Marmora should be actively considered in order to abate environmental sewage disposal problems and to exclude untreated or inadequately treated sewage flows from the Crowe River.

All of which is respectfully submitted,

District Engineer: _____


J. K. Theil

Approved by: _____

J. R. Barr, Director,
Division of Sanitary Engineering.

Prepared by: R. G. Barrens

/mh

TABLE 1

SAMPLE POINT NO.	DATE OF SAMPLE 1965	DESCRIPTION	CROWE RIVER IN MARMORA				NITROGEN AS N		BACTERIOLOGICAL EXAMINATION COLIFORMS/100 ML (MEMBRANE FILTER)
			5-DAY BOD	S O L I D S			FREE AMMONIA	TOTAL KJELDAHL	
				TOTAL	SUSP.	DISS.			
TX 46.96	OCT. 14	CROWE RIVER OPPOSITE LINN STREET IN DOWNSTREAM PART OF MARMORA	0.4	142	6	136	0.06	0.52	100
TX 47.17	OCT. 14	CROWE RIVER AT BATHING AREA - EAST BANK OF RIVER - SOUTH OF MARMORA	0.06	154	1	153	0.06	0.46	300
TX 47.50	OCT. 14	CROWE RIVER AT DAM IN UPSTREAM PART OF MARMORA	1.5	168	1	167	0.13	0.40	34

NOTE: ALL ANALYSES EXCEPT PH REPORTED IN PPM UNLESS OTHERWISE INDICATED

TABLE II

OUTFALLS TO CROWE RIVER IN MARMORA

SAMPLE POINT NO.	DATE OF SAMPLE 1965	DESCRIPTION	5-DAY BOD	S O L I D S			ANIONIC DETERGENTS		BACTERIOLOGICAL EXAMINATION COLIFORMS/100 ML, (MEMBRANE FILTER)
				TOTAL	SUSP.	DISS.	AS	ABS	
-----	OCT. 14	DISCHARGE FROM MARMORA DAIRY TO LOW-LYING AREA NEAR CROWE RIVER (WASTE NOT GAINING ACCESS TO RIVER)	170.0	396	189	207	--	--	109,000,000
TX 47.11	OCT. 14	STORM SEWER OUTFALL TO EAST BANK OF RIVER SOUTH OF BATHING AREA (DOWNSTREAM)	5.8	680	12	668	0.6	0.6	490,000
TX 47.28P	OCT. 14	DISCHARGE OF LAUNDRY WASTE TO LOW-LYING AREA NEAR EAST BANK OF CROWE RIVER	59.0	530	178	352	26.0	26.0	28,500,000

NOTE: ALL ANALYSES EXCEPT PH REPORTED IN PPM UNLESS OTHERWISE INDICATED



LEGEND

TX-47-17 - STREAM SAMPLING POINT SHOWING MILEAGE

TX-47-28
P - OUTFALL SHOWING STREAM AND MILEAGE
- TYPE OF OUTFALL

P - PRIVATE SEWER

W - STORM SEWER

ONTARIO WATER RESOURCES COMMISSION

VILLAGE OF MARMORA WATER POLLUTION SURVEY 1965

SCALE: 400 200 0 400 FEET

DRAWN BY: L.L. BROOME DATE: MARCH, 1966

CHECKED BY: DRAWING No: 66-18